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(54) **LITHIUM ION BATTERIES WITH TITANIA/GRAPHENE ANODES**

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(51) **Int. Cl.**

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(58) **Field of Classification Search**
USPC ..... 29/592, 592.1; 423/448, 445 R, 414; 429/122, 209, 231.5; 361/306.3
See application file for complete search history.

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(57) **ABSTRACT**

Lithium ion batteries having an anode comprising at least one graphene layer in electrical communication with titania to form a nanocomposite material, a cathode comprising a lithium olivine structure, and an electrolyte. The graphene layer has a carbon to oxygen ratio of between 15 to 1 and 500 to 1 and a surface area of between 400 and 2630 m^2/g. The nanocomposite material has a specific capacity at least twice that of a titania material without graphene material at a charge/discharge rate greater than about 10 C. The olivine structure of the cathode of the lithium ion battery of the present invention is $LiMPO_4$ where M is selected from the group consisting of Fe, Mn, Co, Ni and combinations thereof.

8 Claims, 15 Drawing Sheets